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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,643	12/20/2001	Kie Y. Ahn	1303.030US1	2660

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SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER

PHAM, LONG

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 05/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/028,643

Applicant(s)

AHN ET AL.

Examiner

Long Pham

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) 14-54 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-13,55 and 62-67 is/are allowed.
- 6) ☒ Claim(s) 56-61 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 56, have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 56, 57, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (AAPA) of this application in view of Yano et al. (US '080) and Japan 2001332546A (JP '546A).

AAPA teaches a method of forming a gate oxide on a transistor body region, comprising (see figures 1 and 2a-2c and the Background of the Invention of this application):

depositing a metal alloy layer by sputtering on the body region; and
oxidizing the metal alloy layer to form a metal oxide layer on the body region.

AAPA teaches forming the metal alloy layer by sputtering but fails to teach forming the metal alloy layer by thermal evaporation or electron beam evaporation as recited in present claim 56.

Yano et al teach forming metal alloy by electron beam evaporation deposition and subsequently oxidizing in presence of oxygen gas to form an metal oxide. See col. 31, line 30 to col. 32, line 45.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to form the oxide layer as by taught by Yano et al. in the method of AAPA because in doing so an oxide layer having improved crystallinity and surface properties is obtained. See col. 7, lines 18-24.

AAPA and Yano et al. fail to teach that the metal alloy of cobalt and titanium is used to form the metal oxide as recited in present claim 56.

However, the use of metal alloy of cobalt and titanium in forming metal oxide is well-known to one of ordinary skill in the art of making semiconductor devices.

AAPA and Yano et al. fail to teach that the oxidation is done by in presence of krypton and oxygen as recited in present claim 58.

JP '546A teaches that oxidation is done in the presence of krypton and oxygen. See the English abstract.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to perform the oxidation in presence of krypton and oxygen because in doing so high quality oxide is obtained. See the English abstract.

4. Claims 59 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (AAPA) of this application in view of Yano et al. (US '080) and Japan 2001332546A (JP '546A).

AAPA teaches a method of forming a gate oxide on a transistor body region, comprising (see figures 1 and 2a-2c and the Background of the Invention of this application):

depositing a metal alloy layer by sputtering on the body region; and
oxidizing the metal alloy layer to form a metal oxide layer on the body region.

AAPA teaches forming the metal alloy layer by sputtering but fails to teach forming the metal alloy layer by thermal evaporation or electron beam evaporation as recited in present claim 59 and 60.

Yano et al teach forming metal alloy by electron beam evaporation deposition and subsequently oxidizing in presence of oxygen gas to form an metal oxide. See col. 31, line 30 to col. 32, line 45.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to form the oxide layer as by taught by Yano et al. in the

method of AAPA because in doing so an oxide layer having improved crystallinity and surface properties is obtained. See col. 7, lines 18-24.

AAPA and Yano et al. fail to teach that the metal alloy of cobalt and titanium is used to form the metal oxide as recited in present claim 59.

However, the use of metal alloy of cobalt and titanium in forming metal oxide is well-known to one of ordinary skill in the art of making semiconductor devices.

AAPA and Yano et al. fail to teach that the oxidation is done by in presence of krypton and oxygen as recited in present claim 59.

JP '546A teaches that oxidation is done in the presence of krypton and oxygen. See the English abstract.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to perform the oxidation in presence of krypton and oxygen because in doing so high quality oxide is obtained. See the English abstract.

1. Claim 61 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art of this application (AAPA) in view of Yano et al. (US '080) and Japan 2001332546A (JP '546A) as applied to claims 59 and 60 above, and further in view of the following remarks.

AAPA and Yano et al. do not appear to teach the using a single metal target in electron beam evaporation process. However, the use of single metal or multiple metal target is an obvious design choice.

Allowable Subject Matter

2. Claims 1-13, 55, and 62-67 are allowed.

Conclusion

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See

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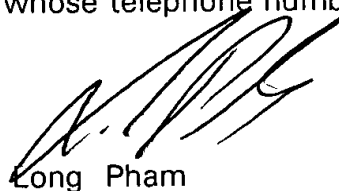
MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 703-308-1092. The examiner can normally be reached on M-F, 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 703-308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-4082 for regular communications and 703-746-4082 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Long Pham

Primary Examiner

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L. P.

May 22, 2003